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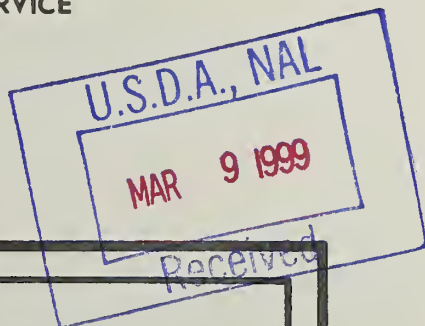


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**UNITED STATES  
STANDARDS**  
*for grades of*  
**CONCENTRATED  
ORANGE JUICE**  
*for*  
**MANUFACTURING**



**EFFECTIVE NOVEMBER 17 , 1964**

**Third Issue**

These standards supersede the standards  
which have been in effect since  
December 20, 1957

This is the third issue of the United States Standards for Grades of Concentrated Orange Juice for Manufacturing. These standards are issued by the Department after careful consideration of all data and views submitted.

These standards were published in the Federal Register of November 17, 1964 (29 F.R. 15358), and became effective on that date.

As is the case of other standards for processed fruits and vegetables, these standards are designed to serve as a convenient basis for sales, for establishing quality control programs, and for determining loan values. They will also serve as a basis for the inspection of this commodity by Federal inspection service, which is available for the inspection of other processed products as well.

The Department welcomes suggestions which might aid in improving these standards in future revisions. Comments may be submitted to, and copies of these standards obtained from:

Chief, Processed Products Standardization  
and Inspection Branch  
Fruit and Vegetable Division, AMS  
U.S. Department of Agriculture  
Washington, D. C. 20250



# UNITED STATES STANDARDS FOR GRADES OF CONCENTRATED ORANGE JUICE FOR MANUFACTURING <sup>1</sup>

Effective November 17, 1964

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**AUTHORITY:** The provisions of this subpart issued under secs. 202-208, 60 Stat. 1087, as amended; 7 U.S.C. 1621-1627.

## PRODUCT DESCRIPTION, STYLES, GRADES

### § 52.2221 Product description.

Concentrated orange juice for manufacturing is the product as defined in the standards of identity (21 CFR 27.114 and 21 CFR 27.115) issued pursuant to the Federal Food, Drug, and Cosmetic Act.

### § 52.2222 Grades.

(a) "U.S. Grade A for Manufacturing" (or "U.S. Fancy for Manufacturing") is the quality of concentrated orange juice that reconstitutes properly and of which the reconstituted juice: (1) Has a rea-

sonably good color, (2) is practically free from defects, (3) possesses a reasonably good flavor, and (4) scores not less than 90 points when scored in accordance with the scoring system outlined in this subpart.

(b) "U.S. Grade C for Manufacturing" (or "U.S. Standard for Manufacturing") is the quality of concentrated orange juice that reconstitutes properly, and of which the reconstituted juice: (1) Has a fairly good color, (2) is fairly free from defects, (3) possesses a fairly good flavor, and (4) scores not less than 80 points when scored in accordance with the scoring system outlined in this subpart.

(c) "Substandard" is the quality of concentrated orange juice for manufacturing that fails to meet the requirements of U.S. Grade C for Manufacturing.

### FILL OF CONTAINER

### § 52.2223 Recommended fill of container.

The recommended fill of container is not incorporated in the grades of the finished product since fill of container, as such, is not a factor of quality for the purposes of these grades. It is recommended that the container be as full of concentrated orange juice as practicable without impairment of quality.

### FACTORS OF QUALITY

### § 52.2224 Ascertaining the grade of a sample unit.

(a) *General.* The grade of a sample unit of concentrated orange juice for manufacturing is ascertained by considering the faculty of reconstituting properly which is not scored; the ratings for the factors of color, defects, and flavor which are scored; the total score; and the limiting rules which may be applicable.

(b) *Factors rated by score points.* The relative importance of each factor

<sup>1</sup> Compliance with the provisions of these standards shall not excuse failure to comply with the provisions of the Federal Food, Drug, and Cosmetic Act or with applicable state laws and regulations.

which is scored is expressed numerically on the scale of 100. The maximum number of points that may be given such factors are:

Factors:	Points
Color -----	40
Defects -----	20
Flavor -----	40
Total score-----	100

§ 52.2225 Ascertaining the rating for the factors which are scored.

The essential variations within each factor which is scored are so described that the value may be ascertained for each factor and expressed numerically. The numerical range within each factor which is scored is inclusive (for example, "18 to 20 points" means 18, 19, or 20 points).

§ 52.2226 Color.

(a) *Evaluation of color.* (1) The color of concentrated orange juice for manufacturing, where applicable, is evaluated by comparing the color of the reconstituted product with the USDA Orange Juice Color Standards so that these color standards become points of reference.

(2) Such comparison is made under an artificial light source of approximately 150 candle intensity and having a spectral quality approximating that of daylight under a moderately overcast sky and a color temperature of 7500 degrees Kelvin,  $\pm 200$  degrees.

(3) The USDA Orange Juice Color Standards range from yellow-orange to yellow color, with USDA OJ 1 being the most orange color in the series.

(b) *Procedure in evaluating color.*

(1) Place the reconstituted juice in a clear glass test tube of 1 inch diameter.

(2) Arrange color standards in a test tube rack or similar device so that light coming from above strikes the standards at a 45 degree angle. The standards are inclined at a 45 degree angle against a neutral grey background. Observe the standards and product at right angles to the tubes.

(3) Classify the juice by inserting the tube of juice where it best fits in the series of color standards. Orange juice

differing in color and brightness from the most nearly matching USDA Orange Juice Color Standard is evaluated by considering the amount of difference and its effect on the total appearance of the juice.

(c) *Availability of color standards.* The USDA Orange Juice Color Standards cited in this section are official color standards which may also be applied to other orange juices. Information regarding these color standards, and their availability, may be obtained from:

Processed Products Standardization and Inspection Branch,  
Fruit and Vegetable Division,  
Agricultural Marketing Service,  
U.S. Department of Agriculture,  
Washington, D.C., 20250.

(d) *(A Mfg.) Classification.* Concentrated orange juice for manufacturing of which the reconstituted juice possesses a reasonably good color may be given a score of 36 to 40 points. "Reasonably good color" means a reasonably good yellow to yellow-orange color, typical of properly processed and properly concentrated orange juice and reasonably free from browning due to scorching, oxidation, caramelization, or other causes. Concentrated orange juice for manufacturing that meets this criterion may be assigned score points in accordance with the following schedule:

As compared with USDA Orange Juice Color Standards:	Score
Equal to or better than USDA OJ 2-----	40 points
Equal to or better than USDA OJ 3-----	39 points
Equal to or better than USDA OJ 4-----	38 points
Equal to or better than USDA OJ 5-----	37 points
Equal to or better than USDA OJ 6-----	36 points

(e) *(C Mfg.) Classification.* If the reconstituted juice possesses a fairly good color, a score of 32 to 35 points may be given. Concentrated orange juice for manufacturing that falls into this classification shall not be graded above U.S. Grade C for Manufacturing regardless of the total score for the product (this is a limiting rule). "Fairly good color" means that the juice may be slightly amber or very light in color and may



show evidence of slight browning but is not off color for any reason.

(f) (*SStd Mfg.*) *Classification*. If the reconstituted juice fails to meet the requirements of paragraph (e) of this section a score of 0 to 31 points may be given. Concentrated orange juice for manufacturing that falls into this classification shall not be graded above Substandard, regardless of the total score for the product (this is a limiting rule).

#### § 52.2227 Defects.

(a) *General*. The factor of defects concerns the degree of freedom from small seeds and portions thereof; from discolored specks, white flakes, harmless extraneous material, and other similar defects; and from juice sacs and particles of membrane, core, and peel in excess of that normally present in orange juice.

(b) *Small seeds and portions thereof*. "Small seeds and portions thereof" means seed, whether fully developed or not, and particles of seed that could pass readily through round perforations  $\frac{1}{8}$  inch (3.2 mm.) in diameter.

(c) (*A Mfg.*) *Classification*. Concentrated orange juice for manufacturing of which the reconstituted juice is practically free from defects may be given a score of 18 to 20 points. "Practically free from defects" means that any combination of defects present may no more than slightly detract from the appearance or drinking quality of the juice.

(d) (*C Mfg.*) *Classification*. If the reconstituted juice is fairly free from defects, a score of 16 or 17 points may be given. Concentrated orange juice for manufacturing that falls into this classification shall not be graded above U.S. Grade C for Manufacturing, regardless of the total score for the product (this is a limiting rule). "Fairly free from defects" means that any combination of defects present may not seriously detract from the appearance or drinking quality of the juice.

(e) (*SStd. Mfg.*) *Classification*. Concentrated Orange Juice for Manufacturing that fails to meet the requirements of paragraph (d) of this section may be given a score of 0 to 15 points and shall not be graded above Substandard, regardless of the total score for the product (this is a limiting rule).

#### § 52.2228 Flavor.

(a) (*A Mfg.*) *Classification*. Concentrated orange juice for manufacturing of which the reconstituted juice possesses a reasonably good flavor may be given a score of 36 to 40 points. "Reasonably good flavor" means that the flavor is typical of reconstituted concentrated orange juice from properly processed and concentrated orange juice; that the flavor may range from high acidity to low acidity; is practically free from traces of scorching, caramelization, oxidation, or terpene; and is free from other off flavors of any kind. To score in this classification the ratio of the Brix value of the concentrate to the acid shall be not less than 8 to 1 nor more than 20 to 1.

(b) (*C Mfg.*) *Classification*. If the reconstituted juice possesses a fairly good flavor, a score of 32 to 35 points may be given. Concentrated orange juice for manufacturing that falls into this classification shall not be graded above U.S. Grade C for Manufacturing, regardless of the total score for the product (this is a limiting rule). "Fairly good flavor" means a normal flavor for reconstituted concentrated orange juice; and that the flavor may range from high acidity to low acidity; may have a slightly caramelized or slightly oxidized flavor or may possess traces of terpene but is free from off flavors of any kind. To score in this classification the ratio of the Brix value of the concentrate to the acid shall be not less than 8 to 1 nor more than 24 to 1.

(c) (*SStd Mfg.*) *Classification*. If the concentrated orange juice for manufacturing fails to meet the requirements of paragraph (b) of this section, a score of 0 to 31 points may be given. Concentrated orange juice for manufacturing that falls into this classification shall not be graded above Substandard, regardless of the total score for the product (this is a limiting rule).

#### EXPLANATIONS AND METHODS OF ANALYSES

##### § 52.2229 Definitions of terms and methods of analyses.

(a) *Reconstituted juice*. "Reconstituted juice" means the product obtained by thoroughly mixing the concentrate with the amount of distilled water to pro-

duce an orange juice of between 11.8 and 12.8 degrees Brix.

(b) *Reconstitutes properly*. "Reconstitutes properly" means that the concentrate goes into solution readily; and that in approximately 250 ml. of the reconstituted juice, after standing four (4) hours at a temperature of not less than 68 degrees Fahrenheit in a clean glass cylinder (approximately 1¼ inches (3 cm.) in diameter, there may be a noticeable separation of suspended matter but any resulting zone of greater clarity shall be definitely turbid and not clear or transparent.

(c) *Acid*. "Acid" means the percent by weight of total acidity, calculated as anhydrous citric acid, in the concentrated orange juice. Total acidity is determined by titration with standard sodium hydroxide solution, using phenolphthalein as indicator.

(d) *Brix*. "Brix" of the reconstituted juice means the degree Brix as determined by the Brix hydrometer calibrated at 20 degrees Centigrade (68 degrees Fahrenheit) and to which any applicable temperature correction has been applied.

(e) *Brix value*. "Brix value" in concentrated orange juice for manufacturing is the refractometric sucrose value determined in accordance with the "International Scale of Refractive Indices of Sucrose Solutions" and to which the applicable correction for acid is added (see Table I of this subpart for corrections). The measurement of Brix value is determined on the concentrate in accordance with the refractometric method for sugars and sugar products, outlined in the "Official Methods of Analysis of the Association of Official Agricultural Chemists."

(f) *Brix value-acid ratio*. The Brix value-acid ratio is the ratio of the Brix value of the concentrate in degrees Brix to the grams of anhydrous citric acid per 100 grams of concentrate.

TABLE I<sup>1</sup>—CORRECTIONS FOR OBTAINING BRIX VALUE

Citric acid anhydrous (percent by weight)	Correction to be added to refractometer su- crose value to obtain degree Brix value
2.0-----	0.39
2.2-----	.43
2.4-----	.47
2.6-----	.51
2.8-----	.54
3.0-----	.58
3.2-----	.62
3.4-----	.66
3.6-----	.70
3.8-----	.74
4.0-----	.78
4.2-----	.81
4.4-----	.85
4.6-----	.89
4.8-----	.93
5.0-----	.97

<sup>1</sup> Source: "Refractometric Determination of Soluble Solids in Citrus Juices," by J. W. Stevens and W. E. Baier, from the Analytical Edition of Industrial and Engineering Chemistry, Vol. II, Page 447, August 15, 1939.

#### LOT COMPLIANCE

#### § 52.2230 Ascertaining the grade of a lot.

The grade of a lot of concentrated orange juice for manufacturing covered by these standards is determined by the procedures set forth in the Regulations Governing Inspection and Certification of Processed Fruits and Vegetables, Processed Products Thereof, and Certain Other Processed Food Products (§§ 52.1 to 52.87).



## SCORE SHEET

## § 52.2231 Score sheet for concentrated orange juice for manufacturing.

Size and kind of container.....		
Container mark or identification.....		{ Cans..... Cases.....
Label (including reconstitution factor).....		
Liquid measure (fluid ounces).....		
Vacuum (inches).....		
Brix value (of concentrate).....		
Total acidity:		
As anhydrous citric.....		
Percent by weight.....		
Brix value-acid ratio ( :1).....		
Reconstitutes properly: (yes) (no).....		
Preservative (or kind) (yes) (no).....		
Factors	Score points	
Color.....	40	{ A Mfg. 36-40 C Mfg. <sup>1</sup> 32-35 SStd. Mfg. <sup>1</sup> 0-31
Defects.....	20	{ A Mfg. 18-20 C Mfg. <sup>1</sup> 16-17 SStd. Mfg. <sup>1</sup> 0-15
Flavor.....	40	{ A Mfg. 36-40 C Mfg. <sup>1</sup> 32-35 SStd. Mfg. <sup>1</sup> 0-31
Total score.....	100	
Grade for manufacturing.....		

<sup>1</sup> Indicates limiting rule.

The United States Standards for Grades of Concentrated Orange Juice for Manufacturing (which is the third issue) contained in this subpart shall become effective upon publication hereof in the **FEDERAL REGISTER**, and will thereupon supersede the United States Standards for Grades of Concentrated Orange Juice for Manufacturing which have been in effect since December 20, 1957.

Dated: November 12, 1964.

G. R. GRANGE,  
Deputy Administrator,  
Marketing Services.





## EXCERPT FROM TITLE 21 – FOOD AND DRUGS

## CHAPTER 1 – FOOD AND DRUG ADMINISTRATION, DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

## Part 27 – Canned Fruits; Definitions and Standards of Identity; Quality; and Fill of Container

**§ 27.109 Frozen concentrated orange juice, frozen orange juice concentrate; identity; label statement of optional ingredients.**

(a) Frozen concentrated orange juice is the food prepared by removing water from the juice of mature oranges as provided in § 27.105, to which juice may be added unfermented juice obtained from mature oranges of the species *Citrus reticulata*, or hybrids thereof, or of *Citrus aurantium*, or both. However, in the unconcentrated blend the volume of juice from *Citrus reticulata* shall not exceed 10 percent and from *Citrus aurantium* shall not exceed 5 percent. The concentrate so obtained is frozen. In its preparation, seeds (except embryonic seeds and small fragments of seeds that cannot be separated by good manufacturing practice) and excess pulp are removed, and a properly prepared water extract of the excess pulp so removed may be added. Orange oil, orange pulp (other than washed or spent pulp), orange essence (obtained from orange juice), orange juice and other orange juice concentrate as provided in this section or concentrated orange juice for manufacturing provided in § 27.114 (when made from mature oranges), water, and one or more of the optional sweetening ingredients specified in paragraph (b) of this section may be added to adjust the final composition. Any of the ingredients of the finished concentrate may have been so treated by heat as to reduce substantially the enzymatic activity and the number of viable microorganisms. The finished food is of such concentration that when diluted according to label directions the reconstituted article will contain not less than 11.8 percent by weight of orange juice sol-

uble solids, exclusive of the solids of any added optional sweetening ingredients. The dilution ratio shall be not less than three plus one. For the purposes of this section and § 27.110, the term "dilution ratio" means the whole number of volumes of water per volume of frozen concentrate required to produce reconstituted orange juice having orange juice soluble solids of not less than 11.8 percent.

(b) The optional sweetening ingredients referred to in paragraph (a) of this section are sugar, sugar sirup, invert sugar, invert sugar sirup, dextrose, corn sirup, dried corn sirup, glucose sirup, and dried glucose sirup.

(c) If one or more of the sweetening ingredients specified in paragraph (b) of this section is added to the frozen concentrated orange juice, the label shall bear the statement "----- added to reduce tartness," the blank being filled in with the name or an appropriate combination of names of the sweetening ingredients used. However, for the purpose of this section, the name "sweetener" may be used in lieu of the specific name or names of the sweetening ingredients.

(d) The name of the food concentrated to a dilution ratio of three plus one is "frozen concentrated orange juice" or "frozen orange juice concentrate." The name of the food concentrated to a dilution ratio greater than three plus one is "frozen concentrated orange juice, ----- plus 1" or "frozen orange juice concentrate, ----- plus 1," the blank being filled in with the whole number showing the dilution ratio; for example, "frozen orange juice concentrate, 4 plus 1." However, where the label bears directions for making 1 quart

*Labeling provisions stayed.  
March 25, 1964; 29 F.R. 3701*

of reconstituted orange juice (or multiples of a quart), the blank in the name may be filled in with a mixed number; for example, "frozen orange juice concentrate,  $4\frac{1}{3}$  plus 1." For containers larger than 1 pint, the dilution ratio in the name may be replaced by the concentration of orange juice soluble solids in degrees Brix; for example, a 62° Brix concentrate in 3½-gallon cans may be named on the label "frozen concentrated orange juice, 62° Brix."

(e) Wherever the name of the food appears on the label so conspicuously as to be easily seen under customary conditions of purchase, the statements specified in this section for naming the optional ingredients used shall immediately and conspicuously precede or follow the name of the food, without intervening written, printed, or graphic matter.

**§ 27.114 Concentrated orange juice for manufacturing, orange juice concentrate for manufacturing; identity; label statement of optional ingredients.**

(a) Concentrated orange juice for manufacturing is the food that complies with the requirements for composition and labeling of optional ingredients prescribed for frozen concentrated orange juice by § 27.109, except that it is either not frozen, or it is less concentrated, or both, and the oranges from which the juice is obtained may deviate from the standards for maturity in that they are below the minima for Brix and Brix-acid ratio for such oranges: *Provided, however*; That the concentration of orange juice soluble solids is not less than 20° Brix.

(b) The name of the food is "concentrated orange juice for manufacturing,

-----" or "----- orange juice concentrate for manufacturing," the blank being filled in with the figure showing the concentration of orange juice soluble solids in degrees Brix.

**§ 27.115 Concentrated orange juice with preservative; identity; label statement of optional ingredients.**

(a) Concentrated orange juice with preservative complies with the requirements for composition and labeling of optional ingredients prescribed for concentrated orange juice for manufacturing by § 27.114, except that a preservative is added to inhibit spoilage.

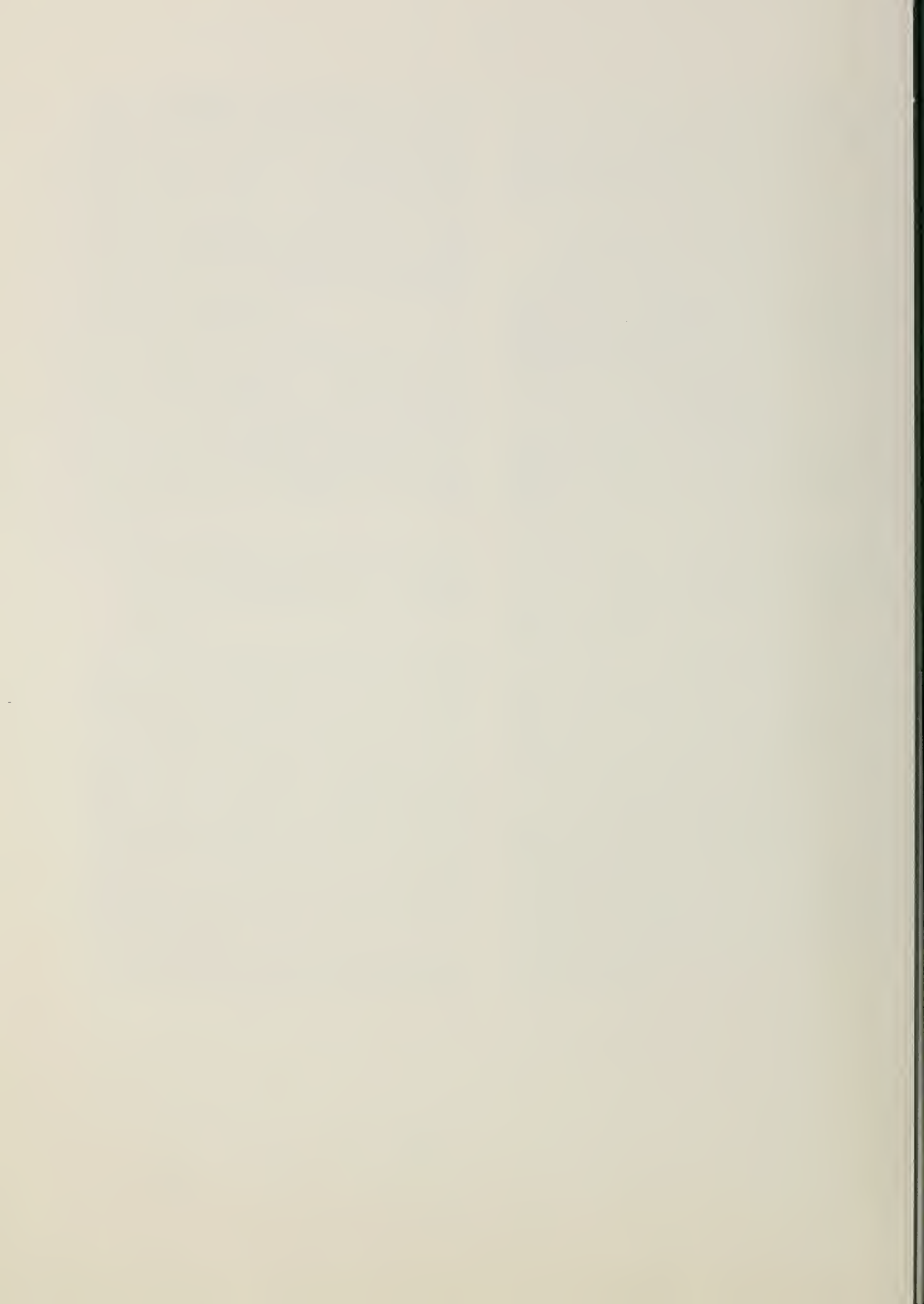
(b) The preservatives referred to in paragraph (a) of this section are sodium benzoate and sorbic acid. Sodium benzoate or sorbic acid may be used in an amount not exceeding 0.2 percent, by weight.

(c) The name of the food is "concentrated orange juice with preservative, -----," the blank being filled in with the figure showing the concentration of orange juice soluble solids in degrees Brix.

(d) The label shall bear the statement "---- added as a preservative," the first blank being filled in with the percent by weight of the preservative used and the second blank by the name "sorbic acid" or "sodium benzoate" (or "benzoate of soda"), as appropriate.

(e) Wherever the name of the food appears on the label so conspicuously as to be easily seen under customary conditions of purchase, the statement specified in paragraph (d) of this section for naming the preservative ingredient used shall immediately and conspicuously precede or follow the name of the food, without intervening written, printed, or graphic matter.







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